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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/707,957

01/28/2004

Leendert M. Huisman

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7590

04/10/2006

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EXAMINER

BRITT, CYNTHIA H

ART UNIT

PAPER NUMBER

2138

DATE MAILED: 04/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/707,957

Applicant(s)

HUISMAN ET AL.

Examiner

Cynthia Britt

Art. Unit

2138

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☐ Claim(s) ____ is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>7/16/04, 1/28/04</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claims 1-17 are presented for examination.

Information Disclosure Statement

The information disclosure statements (IDS) submitted on January 28, 2004 and July 16, 2004 have been considered by the examiner. Form 1449 has been signed and returned with this office action.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-6, 9, 16, and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Kauper et al. U.S. Patent No. 6,615,380.

As per claim 1, Kauper et al. teach the claimed method of segmenting and reconfiguring scan chains to diagnose defects in the scan chains (Abstract) comprising: partitioning a plurality of serially extending scan chains into a plurality of serially arranged segments, such that each serially extending scan chain comprises a plurality of serially extending segments; positioning a plurality of switches (multiplexers), having

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control inputs to control switching of the switches, between the plurality of segments of each scan chain; controlling the control inputs of the plurality of switches to connect, each segment of each scan chain except an initial segment (inherent) to a preceding serial segment in the same scan chain, and each segment of each scan chain except a final segment (inherent) to a next serial segment in the same scan chain, or each segment of each scan chain except an initial segment (inherent) to a preceding serial-adjacent segment in an adjacent scan chain, and each segment of each scan chain except a final segment (inherent) to a next serial-adjacent segment in an adjacent scan chain (Figure 5 column 2 lines 24-27), wherein, depending upon the control inputs to the switches, an output of each scan segment is directed either to a next serial segment in the same scan chain or to a next serial-adjacent segment in an adjacent scan chain, and a preceding serial segment in an adjacent scan chain and the next serial segment in an adjacent scan chain are in different scan chains. (Column 2 lines 47-57)

As per claim 2, Kauper et al. teach the claimed method including: directing scan in data patterns into the plurality of serially extending scan chains; identifying particular defective segments of the plurality of serially extending scan chains by controlling the switches to connect and shift the data pattern out of each segment of a scan chain serially to a next serial segment in the same scan chain, or to connect and shift the data pattern out of each segment of a scan chain to a next serial-adjacent segment in an adjacent scan chain, with a sequence of serial shifts and serial-adjacent shifts being selected to identify particular defective segments of the plurality of serially extending

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scan chains. (Column 5 lines 39-42 and 56-63, Figure 3B)

As per claim 3, Kauper et al. teach the claimed method wherein the step of controlling asserts a control input of a first type that connects and shifts the data pattern out of each segment of a scan chain to a next serial segment in the same scan chain, or a control input of a second type that connects and shifts the data pattern out of each segment of a scan chain to a next serial-adjacent segment in an adjacent scan chain. (Column 8 lines 52-65)

As per claim 4, Kauper et al. teach the claimed method , wherein the switches are multiplexors and a single control input controls all of the multiplexors. (Column 8 lines 25-27)

As per claim 5, Kauper et al. teach the claimed method, wherein the single control input statically restructures the scan chains prior to directing scan in data patterns into the plurality of serially extending scan chains. (Column 8 lines 52-65)

As per claim 6, Kauper et al. teach the claimed method, wherein the step of partitioning partitions all segments in all scan chains to be the same length. (Column 8 lines 52-65)

As per claims 9 and 12, Kauper et al. teach the claimed method, wherein the single control input dynamically restructures the scan chains while the data patterns are being clocked through the plurality of dynamically restructured scan chains. (Column 7 lines 9-14)

As per claim 16, Kauper et al. teach the claimed method, wherein in a first test, an input scan in data pattern is introduced into the beginning of each serially extending scan chain, and the switches are controlled by the control input of a first type such that the data patterns are clocked serially through the scan chains, and if all scan chains are perfect with no fails, the scan out data pattern at the end of each scan chain is identical to the input scan in data pattern or to a logical inverse of the input scan in data pattern. (Column 6 lines 29-35)

As per claim 17, Kauper et al. teach the claimed method, wherein after the first test, when at least one fail scan chain suffers a fail wherein the scan out data pattern at the end of the fail scan chain is not identical to the input scan in data pattern into the fail scan chain or to the logical inverse of the input scan in data pattern into the fail scan chain, then the control input is set to the second type such that the scan chains are reconfigured to connect each segment of a scan chain to a next serial-adjacent segment in an adjacent scan chain. (Column 7 lines 1-25)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 7, 10-11, and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kauper et al. U.S. Patent No. 6,615,380 in view of Whetsel U.S. Patent No. 6,519,727.

As per claims 7 and 8, Kauper et al. substantially teach the claimed method (of claim 1 - see rejection above of claim 1). Not explicitly disclosed is that the segments of the scan chain are the same length. However in an analogous art, Whetsel teaches making the scan paths the same length (column 3 lines 54-57). Therefore it would have been obvious to a person having ordinary skill in the art at the time this invention was made to have made the scan paths equal length in a system of scan path testing. One would have been motivated to make the above combination not only to reduce the test pattern length as suggested by Kauper et al. (Abstract, Column 8 lines 52-65), but also as suggested by Whetsel (Abstract) but also to reduce the power used by the system during the test.

As per claims 10-11, and 13-14, Kauper et al. substantially teach the claimed method (of claims 1-4 and 9 - see rejections above of claims 1-4 and 9). Not explicitly disclosed is that the scan chains to route blocks of data having a uniform length through the dynamically restructured scan chains. However, in an analogous art, Whetsel teaches making the scan paths the same length (column 3 lines 54-57). Therefore it would have been obvious to a person having ordinary skill in the art at the time this invention was made to have made the scan paths equal length in a system of scan path testing. One would have been motivated to make the above combination not only to reduce the test pattern length as suggested by Kauper et al. (Abstract, Column 8 lines

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52-65, Column 9 lines 1-13), but also as suggested by Whetsel (Abstract) but also to reduce the power used by the system during the test.

As per claim 15, Kauper et al. substantially teach the claimed method (of claim 1 - see rejection above of claim 1). Not explicitly disclosed is that the step of partitioning partitions the plurality of scan chains into a plurality of segments wherein the number n of segments in each scan chain is equal to the number n of scan chains. However, in an analogous art, Whetsel teaches "The scan paths 204 and 205 are produced by dividing the number of scan cells (L) in scan path 102 by two ($L/2$), such that the scan cell lengths of scan paths 204 and 205 are preferably one half the scan cell length of scan path 102. If the number of scan cells (L) in 102 is not equally divisible by 2, then scan paths 204 and 205 may not contain an exactly equal number of scan cells, i.e. one of the scan paths 204 or 205 may contain an additional remainder scan cell. If one scan path includes an additional remainder scan cell, a dummy scan cell may be added to the other scan path to equalize the length between both scan paths, if desired."

Therefore it would have been obvious to a person having ordinary skill in the art at the time this invention was made to have used the more specific scan paths of Whetsel with the dynamic reconfiguration process of Kauper et al. . One would have been motivated to make the above combination not only to reduce the test pattern length as suggested by Kauper et al. (Abstract, Column 8 lines 52-65, Column 9 lines 1-13), but also as suggested by Whetsel (Abstract) but also to reduce the power used by the system during the test.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 5,719,878

Yu et al.

This patent teaches equal length scan paths while scan testing a circuit.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Britt whose telephone number is 571-272-3815. The examiner can normally be reached on Monday - Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on 571-272-3819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Cynthia Britt
Examiner
Art Unit 2138